

Exploring farmers spatial knowledge of within-field variation of soil and weed abundance: incentives for participatory weed mapping.

Sanne Heijting¹, Sytze de Bruin², Arnold Bregt², Corné Kempenaar¹

¹ Plant Research International, WUR

²Centre for Geo Information, WUR



Outline of presentation

- Research in Hoeksche Waard (2008/2009)
 - Spatial knowledge, emphasis on soil
- Research in Drenthe/Groningen (2010)
 - Soil and weed knowledge
- Incentives for Participatory Mapping
- Discussion



The arable farmer as the assessor of within-field variation

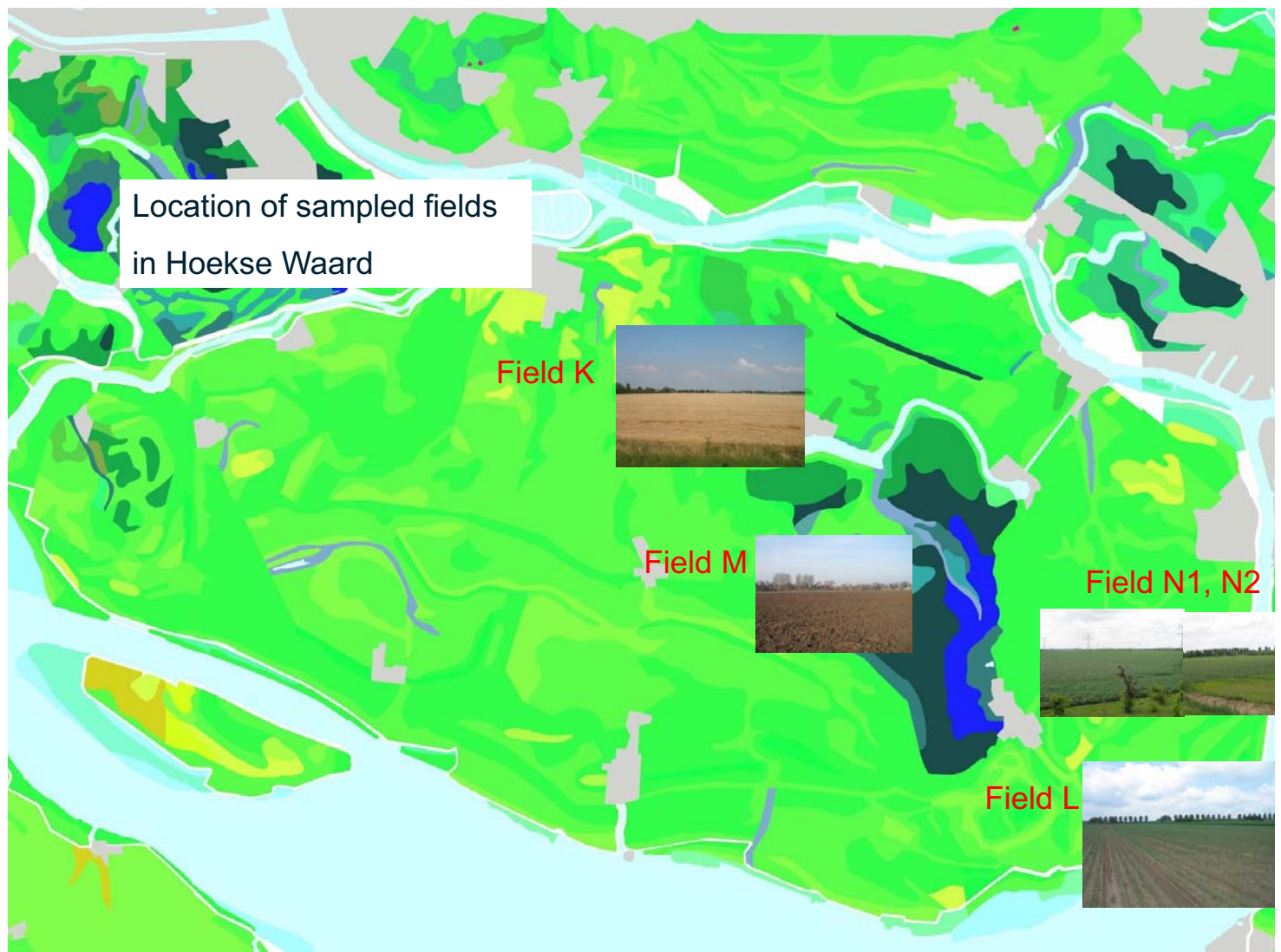


Explore spatial knowledge of farmers:

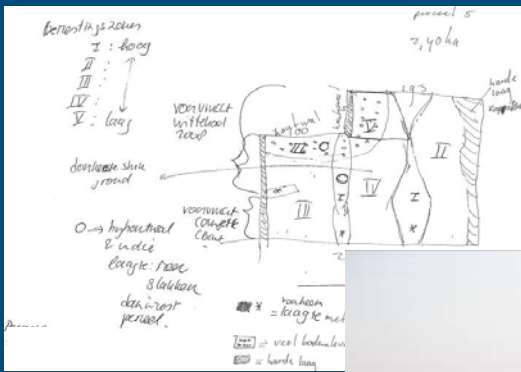
- What does it consist of?
- Can it be made explicit?
- Do they apply their knowledge?
- Compare outcomes of farmer defined management zones with results of soil sampling



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From spatial mind map to soil sampling scheme



- Semi-structured interview
- Field choice
- Drawing of map with zones



- Field visit
- Zonation
- Stake out



NPK
Texture
SOC
pH

- Soil sampling
- Analysis of results
- Evaluation

Features of fields in Hoekse Waard

Geomorphology

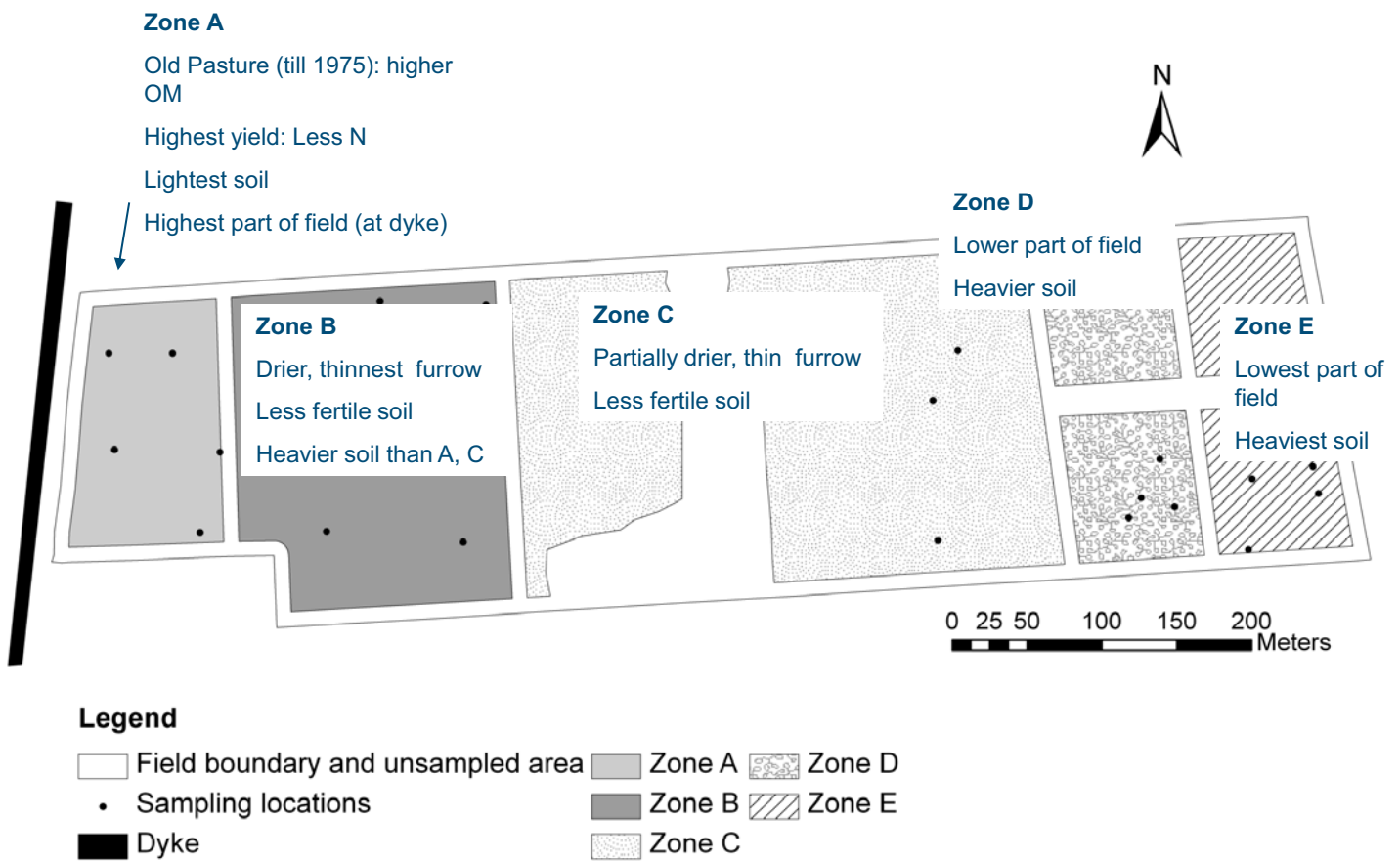
- Texture gradients
- Thickness of furrow
- Old creek ridge (inversion of relief and peat)

Historic land use

- Variation in SOM (old pastures)
- Nutrient status

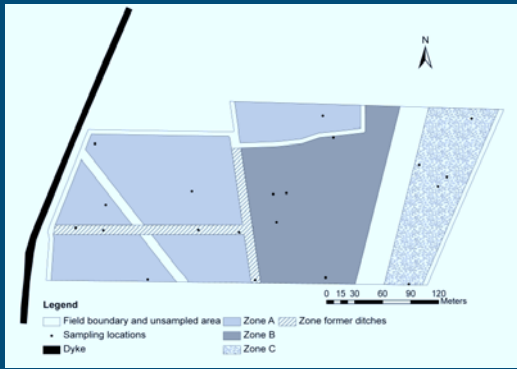
Impermeable layer





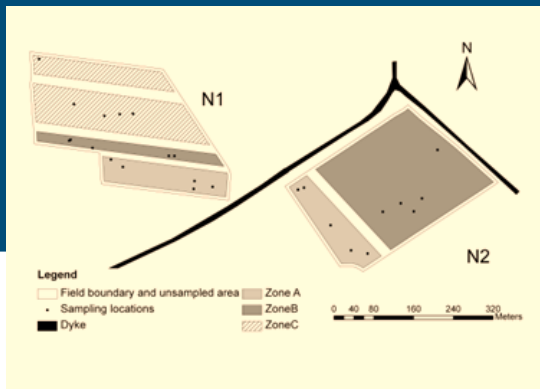
Field K: Results of one-way ANOVA

Zone	Clay %	N _{tot} mg N kg ⁻¹	SOM %	P-AL mg P ₂ O ₅ kg ⁻¹	P-PAE mg P/kg
A	18.8a	1946c	3.68b	662b	2.22b
B	22.0a	1202ab	2.36a	534ab	1.28ab
C	19.6a	1062a	2.04a	468a	0.8a
D	21.8a	1136ab	2.12a	564ab	0.9ab
E	27.2b	1476b	2.72a	608ab	1.12ab
	<i>p</i> <0.001	<i>p</i> <0.001	<i>p</i> <0.001	<i>p</i> <0.01	<i>p</i> <0.001



Farmer/Field L: Zone B & C more herbicide as higher weed density than zone A.

Farmer N/Field N1,2: Zone A of both fields: more *Alopecurus myosuroides*



According to Farmer M Field M:

- Zone B highest density *Stachys palustris* L.
- Zone C mostly perennials such as STAPU, *M. arvensis* L., *Sonchus arvensis* L.
- Zone F highest density *Galinsoga parviflora* Cav
- Zone E lowest weed density
- In general increase in GALPA.

Sources of knowledge

Soil tillage



Soil color
Height differences



Crop growth



Aerial images



Field history



View from dyke

Conclusions

1. Farmer defined management zones coincide with significant differences in texture, organic matter, nutrients
2. Extensive spatial knowledge present
3. Part of spatial knowledge already actively applied intuitively
4. Soil tillage important moment of perception
5. Geomorphology and land use reflected in differences between management zones
6. Spatial knowledge farmer suitable starting point for soil sampling

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<http://www.springerlink.com/content/q532348x0r752q21/>



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Pilot study on farms on reclaimed peat land

Semi structured interview at farms covering following topics:

- General information concerning farm and farmer
- Variation between fields of farm
- Variation within one specific field
- Application of GPS
- Weed management and spatio-temporal occurrence of weeds



Preliminary results

According to farmers within-field soil variation:

- Organic matter content
- Sand
- Height
- Thickness of furrow
- Soil resistance and impermeable layers



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According to farmers (not validated):



- Various weeds occur patchy, both annuals and perennials
- Weed patchiness related to:
 - variation in SOM (*Polygonum maculosa* on higher SOM)
 - spray tracks (*P. annua*)
 - failed spraying
 - open space (*S. nigrum* on headlands)
 - introduction with manure (*E. crus-galli*)
 - sandier, higher and drier parts more *C. album*, *Galeopsis tetrahit*



Results/Discussion/Conclusions pilot study

- Extensive knowledge present with respect to soil and weed
- Some trends/opinions present, support too small
- Knowledge only partially validated

Incentives for participatory weed mapping

- Farmers source of knowledge
- Current societal technical developments:
 - Increasing application of GPS on farms
 - Citizen science http://en.wikipedia.org/wiki/Citizen_science
 - Volunteered Geographic Information (Goodchild, 2007) or collaborative mapping
- Direct link between weed research and weed practice (See paper (Moss, 2007))



The collage consists of four screenshots:

- Top Left:** A screenshot of the 'The Global Invasive Species Team' website. It features a green header with the team's logo and navigation links. The main content area includes sections for 'Invasive 101', 'Invasive 101', 'Invasive 101', and 'Invasive 101', with sub-sections like 'Invasive 101', 'Invasive 101', and 'Invasive 101'. The text discusses 'Preventing and containing the global spread of invaders' and provides information on 'Global Invasive Species Team members'.
- Top Right:** A screenshot of the 'Invasive Alien Plant Program - Map Display' website. It shows a map of the United Kingdom with various locations marked. The map is titled 'Invasive Alien Plant Program - Map Display' and includes a legend and navigation tools. The text on the right side of the map reads 'Welcome to Report-A-Weed' and provides instructions on how to use the reporting tool.
- Bottom Left:** A screenshot of the 'The nature's calendar survey' website. It features a purple header with the text 'The nature's calendar survey' and 'WOODLAND TRUST'. The main content area includes a large image of a red mushroom and a section titled 'Welcome to Nature's Calendar'. The text encourages users to 'record and report your findings' and provides information on 'Species last recorded' and 'Latest calendars'.
- Bottom Right:** A screenshot of the 'National Park Service Inventory & Monitoring Program' website. It features a green header with the text 'National Park Service Inventory & Monitoring Program'. The main content area includes a section titled 'WEED WATCHERS - Become a citizen scientist' and provides information on 'What We Look For', 'Where To Look', and 'Reporting'. The text encourages users to 'become a weed watcher' and provides information on 'What We Look For', 'Where To Look', and 'Reporting'.

Discussion

- Is it feasible to let farmers participate in the EWRS Working Group (WG) on weed mapping?
- How can both farmers and WG benefit from such collaboration?
- What will be the added value for farmers?
- Do such initiatives exist within Europe?
- What would be the best approach?
- How to tackle data quality and validation?



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Thank you for your attention

